IN THE CLAIMS

This listing of the claims will replace all prior versions, and listings, of claims in the application:

1. (Original) An article of manufacture comprising a metal substrate and a coating in contact with the metal substrate, wherein the coating comprises:

(1) linearly conjugated π-systems;

(2) residues of sulfonated lignin or a sulfonated polyflavonoid or derivatives of sulfonated lignin or a sulfonated polyflavonoid; and

(3) a film-forming resin.

2. (Original) The article of claim 1 wherein the derivatives comprise one or more hydroxy, methoxy, ethoxy, hydroxymethyl, or 2-hydroxyethoxy substituents;

3. (Original) The article of claim 1 wherein the residues are of sulfonated lignin or a sulfonated polyflavonoid.

4. (Original) The article of claim 1 wherein the linearly conjugated π-systems comprise repeating monomer units of aniline, thiophene, pyrrole, or phenyl mercaptan, wherein the repeating monomer units of aniline, thiophene, pyrrole, or phenyl mercaptan are optionally ring-substituted with one or more staight or branched alkyl, alkoxy, or alkoxyalkyl groups.

5. (Original) The article of claim 1 wherein the linearly conjugated π-systems comprise polyanilines.

6. (Original) The article of claim 1 wherein the linearly conjugated π-systems comprise polypyrroles or polythiophenes.

7. (Original) The article of claim 1 wherein the linearly conjugated π-systems comprise repeating monomer units selected from the group consisting of aniline, o-ethylaniline, m-ethylaniline, o-ethoxyaniline, m-butylaniline, m-hexylaniline, m-octylaniline, 4-bromoaniline, 2-bromoaniline, 3-bromoaniline, 3-acetamidoaniline, 4-acetamidoaniline, 5-chloro-2-methoxyaniline, 5-chloro-2-ethoxyaniline, 2,5-dimethylaniline, 2,3-dimethylaniline, 2,5-dibutylaniline, 2,5-dimethoxyaniline, tetrahydronaphthylamine, 2-cyanoaniline, 2-thiomethylaniline, 3-(n-butanesulfonic acid)aniline, 2,4-dimethoxyaniline, 4-mercaptoaniline, 4-methylthioaniline, 3-phenoxyaniline, 4-phenoxyaniline, thiophene, pyrrole, and thiophenol.

8. (Original) The article of claim 1 wherein the linearly conjugated π-systems are grafted to the residues.

9. (Original) The article of claim 1 wherein the film-forming resin is selected from the group consisting of polyurethanes, epoxies, neutral resins, acidic resins, acrylics, polyesters, glycidyl acrylates, polyamides, polyimides, polyaramids, polycarbonates, polymethyl methacrylates, poly(amide-imides), polyvinyl fluorides, urea-formaldehyde, phenol-formaldehyde, melamine-formaldehyde and combinations thereof.

10. (Original) The article of claim 1 wherein the film-forming resin comprises an acrylic resin and a melamine formaldehyde resin.

11. (Original) The article of claim 1 wherein the film-forming resin is a water-borne resin.

12. (Original) The article of claim 1 wherein the film-forming resin is an organic-solvent-borne resin.

13. (Original) The article of claim 1 wherein the coating composition is a high solids formulation.

14. (Original) The article of claim 1 wherein the coating composition is UV radiation curable.

15. (Original) The article of claim 1 wherein the coating composition is a powder coating formulation.

16. (Original) The article of claim 1 wherein the coating composition comprises sulfonated lignin.

17. (Currently amended) An article of manufacture comprising a metal substrate and a coating in contact with the metal substrate, wherein the coating comprises ~~The article of claim 1 wherein the coating composition comprises~~ sulfonated lignin, ~~and the linearly conjugated π-systems comprise~~ polyanilines and a film-forming resin.

18-54. (Cancelled)

55. (Original) A method of protecting a metallic substrate from corrosion comprising:

(1) contacting the substrate with a coating composition comprising: (a) linearly conjugated π-systems, (b) residues of sulfonated lignin or a sulfonated polyflavonoid or derivatives of sulfonated lignin or a sulfonated polyflavonoid; and (c) a film-forming resin; and

(2) curing the coating composition to form a corrosion resistant coating on the substrate.

56. (Original) The method of claim 55 wherein the derivatives contain one or more hydroxy, methoxy, ethoxy, hydroxymethyl, or 2-hydroxyethoxy substituents.

57. (Original) The method of claim 55 wherein the residues are of sulfonated lignin or a sulfonated polyflavonoid.

58. (Original) The method of claim 55 further comprising preparing a surface of the metallic substrate for adhesion to the coating composition.

59. (Original) The method of claim 55 wherein the linearly conjugated π-systems comprise repeating monomer units of aniline, thiophene, pyrrole, or phenyl mercaptan, wherein the repeating monomer units of aniline, thiophene, pyrrole, or phenyl mercaptan are optionally ring-substituted with one or more staight or branched alkyl, alkoxy, or alkoxyalkyl groups.

60. (Original) The method of claim 55 wherein the linearly conjugated π-systems comprise polyanilines.

61. (Original) The method of claim 55 wherein the linearly conjugated π-systems comprise polypyrroles or polythiophenes.

62. (Original) The method of claim 55 wherein the linearly conjugated π-systems comprise repeating monomer units selected from the group consisting of aniline, o-ethylaniline, m-ethylaniline, o-ethoxyaniline, m-butylaniline, m-hexylaniline, m-octylaniline, 4-bromoaniline, 2-bromoaniline, 3-bromoaniline, 3-acetamidoaniline, 4-acetamidoaniline, 5-chloro-2-methoxyaniline, 5-chloro-2-ethoxyaniline, 2,5-dimethylaniline, 2,3-dimethylaniline, 2,5-dibutylaniline, 2,5-dimethoxyaniline, tetrahydronaphthylamine, 2-cyanoaniline, 2-thiomethylaniline, 3-(n-butanesulfonic acid)aniline, 2,4-dimethoxyaniline, 4-mercaptoaniline, 4-methylthioaniline, 3-phenoxyaniline, 4-phenoxyaniline, thiophene, pyrrole, and thiophenol.

63. (Original) The method of claim 55 wherein the linearly conjugated π-systems are grafted to the residues.

64. (Original) The method of claim 55 wherein the coating composition comprises sulfonated lignin.

65. (Currently amended) ~~The method of claim 55 wherein the coating composition comprises sulfonated lignin and the linearly conjugated π-systems comprise polyanilines~~ A method of protecting a metallic substrate from corrosion comprising

(1) contacting the substrate with a coating composition comprising: (a) ~~linearly conjugated π-systems,~~ polyanilines; (b) sulfonated lignin ~~or a sulfonated polyflavonoid or derivatives of sulfonated lignin or a sulfonated polyflavonoid~~; and (c) a film-forming resin; and

(2) curing the coating composition to form a corrosion resistant coating on the substrate.

66. (Original) The method of claim 55 wherein the film-forming resin is selected from the group consisting of polyurethanes, epoxies, neutral resins, acidic resins, acrylics, polyesters, glycidyl acrylates, polyamides, polyimides, polyaramids, polycarbonates, polymethyl methacrylates, poly(amide-imides), polyvinyl fluorides, urea-formaldehyde, phenol-formaldehyde, melamine-formaldehyde and combinations thereof.

67. (Original) The method of claim 55 wherein the film-forming resin comprises an acrylic resin and a melamine formaldehyde resin.

68. (Original) The method of claim 55 wherein the film-forming resin is a water-borne resin.

69. (Original) The method of claim 55 wherein the film-forming resin is an organic-solvent-borne resin.

70. (Original) The method of claim 55 wherein the coating composition is a high solids formulation.

71. (Original) The method of claim 55 wherein the coating composition is UV radiation curable.

72. (Original) The method of claim 55 wherein the coating composition is a powder coating formulation.

73. (Original) The method of claim 55 wherein the coating composition is a water-based latex.

74. (New) The article of claim 17 wherein the polyaniline is grafted to the residues.

75. (New) The article of claim 17 wherein the film-forming resin is selected from the group consisting of polyurethanes, epoxies, neutral resins, acidic resins, acrylics, polyesters, glycidyl acrylates, polyamides, polyimides, polyaramids, polycarbonates, polymethyl methacrylates, poly(amide-imides), polyvinyl fluorides, urea-formaldehyde, phenol-formaldehyde, melamine-formaldehyde and combinations thereof.

76. (New) The article of claim 17 wherein the film-forming resin comprises an acrylic resin and a melamine formaldehyde resin.

77. (New) The article of claim 17 wherein the film-forming resin is a water-borne resin.

78. (New) The article of claim 17 wherein the film-forming resin is an organic-solvent-borne resin.

79. (New) The article of claim 17 wherein the coating composition is a high solids formulation.

80. (New) The article of claim 17 wherein the coating composition is UV radiation curable.

81. (New) The article of claim 17 wherein the coating composition is a powder coating formulation.

82. (New) The method of claim 65 wherein the film-forming resin is selected from the group consisting of polyurethanes, epoxies, neutral resins, acidic resins, acrylics, polyesters, glycidyl

acrylates, polyamides, polyimides, polyaramids, polycarbonates, polymethyl methacrylates, poly(amide-imides), polyvinyl fluorides, urea-formaldehyde, phenol-formaldehyde, melamine-formaldehyde and combinations thereof.

83. (New) The method of claim 65 wherein the film-forming resin comprises an acrylic resin and a melamine formaldehyde resin.

84. (New) The method of claim 65 wherein the film-forming resin is a water-borne resin.

85. (New) The method of claim 65 wherein the film-forming resin is an organic-solvent-borne resin.

86. (New) The method of claim 65 wherein the coating composition is a high solids formulation.

87. (New) The method of claim 65 wherein the coating composition is UV radiation curable.

88. (New) The method of claim 65 wherein the coating composition is a powder coating formulation.

89. (New) The method of claim 65 wherein the coating composition is a water-based latex.